

10. A device according to claim 9,

wherein said lock is essentially a conventional buckle with a square frame used in safety belts.

REMARKS

At the outset, the Applicants wish to express their appreciation to the Patent Examiner for the helpful suggestions pertaining to formal matters in the present patent application.

With respect to the claims, recently filed claims 4 to 6 are being canceled without prejudice and are being rewritten as new claims 8 to 10. These claims 8 to 10 overcome the Examiner's formal objections thereto.

The objected-to subject matter has been deleted from page 6 of the specification. The specification has been amended as suggested by the Patent Examiner, namely to recite that "the lock is essentially a conventional buckle comprising a square frame such as buckles used in safety belts".

Withdrawal of the rejection under 35 U.S.C. 132 is respectfully requested.

With regard to Examiner's question about the pelvic support, the Applicants apologize for an erroneous translation, because the Examiner is correct that the specification and the drawings only support that there is only one pelvic support made as a belt and placed around the waist.

The rejection of claims 4-6 by the Patent Examiner under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention is respectfully traversed.

In response thereto, the claims have been amended to recite a more complete and clear-cut description of the listed functions of the elastic tie-members that "are arranged in antagonistic pairs relative to the joints and designed for connecting said elastic tie-members with one another". An appropriate discussion of the claimed device is provided to such an extent that is necessary for performing these functions.

As stated in the specification on page 5, lines 33-34 and on page 6, line 1, the elastic tie-members are arranged on the surface of the patient's body in substantially antagonistic pairs so as to follow the anatomical arrangement of the skeletal muscles and in such a manner that each elastic tie-member has its own antipode. This means that the elastic tie-members located on the posterior trunk surface and adapted

to effect tension, have their own antipodes, i.e., the elastic tie-members that are located on the anterior trunk surface to effect trunk flexion.

It follows from all stated before that these elastic tie-members are placed on the patient's trunk taking account of their position relative to the spine, that is, to the right or left, and the effect produced by the tie-members is spread from the superior thoracic vertebrae to the pelvic girdle.

It is respectfully pointed out that the elastic tie-members arranged on the patient's back simulate the shawl muscles (*m. trapezius*), the muscles of neck (*m. splenius*), and the erector muscles of spine (*m. erector spinae*), while the elastic tie-members on the patient's breast simulate the scalene muscles, i.e., *m. scalenus anterior* and *medius*, the long muscle of neck (*m. longus colli*), as well as *m. rectus abdominalis*, and the like.

The elastic tie-members placed on the limbs likewise simulate the anatomic structure, the symmetrical arrangement of the elastic tie-members at the front and rear (that is, flexor and erector muscles), as well as at the sides (rotator muscles), the multiple-joint concept being applied in the region of the pelvic girdle and legs.

Thus, for instance, the elastic tie members running from the pelvic girdle over the anterior thigh surface to the patella, simulate the arrangement of the m. rectus femoris and, additionally, simulate operation of this muscle, that is, they cause the hip joint to flex and the ankle joint to extend.

Such an arrangement of the elastic tie-members on the body surface does not prevent flexion, extension, rotation, and motion of the limbs to the required position, as well as movements of the patient's trunk.

The elastic tie-members, according to the invention, which must necessarily be situated on the anterior and posterior surfaces and on the patient's limbs, i.e., in order to simulate the action of the flexor and erector muscles, are provided only in the treatment device claimed in the present invention.

Each of the elastic tie-members functions independently or acts upon the opposite elastic tie-member. In this case, no transfer of the tie-member effect from one half of the patient's body to the other occurs, and a force developed between the supports and the elastic tie-members is essentially the force that compresses the spine and/or the limbs.

For all the above reasons, it is firmly believed that all the claims are now in complete compliance with the requirements of 35 U.S.C. 112. Withdrawal of this ground of rejection is respectfully requested.

The Applicants comment upon the prior art rejections of the claims under 35 U.S.C. 102 and 35 U.S.C. 103 as being anticipated by or unpatentable over *Wilkinson*, U.S. Patent No. 5,186,701 or *Romney*, U.S. Patent No. 5,308,305, or *Mikell Jr.*, U.S. Patent No. 2,467,943 in various combinations thereof.

It is respectfully pointed out that the aforementioned comparative construction of the cited references and of the invention being claimed as far as support, elastic means, and their arrangement on the patient's body are concerned, are not similar but differ widely from each other. In this regard, a more complete and clear-cut description of the structural features of the claimed device is provided in comparison with the cited references.

The *Wilkinson* U.S. Patent No. 5,186,701 relates to an aerobic resistance exercise garment having the provision of additional resistance offered to the motion of training.

The *Wilkinson* device has shoulder supports (as shown in FIGS. 2-4 of the drawings). However, these supports are

fashioned as small-size shoulder straps to which elastic tie-members are anchored, two at the front and two at the rear.

It is due to very small areas of the shoulder straps that the front and rear elastic cords can operate only when they are equally tensioned, which results in restriction of their function which manifests itself in that the front and rear elastic cords can be used only simultaneously.

Hence, the prior art shoulder supports cannot be used for performing the same function of the claimed elastic cords as correction means for the patient's body parts for mutual positioning.

The principal difference between the claimed shoulder supports and the Wilkinson ones resides in that the Wilkinson supports are fashioned as wide straps, wherein their lower portion comprise anchoring elements of the elastic tie-members, and which are located from the neck to the shoulder joint and are intended for developing an adequately high friction between the strap and the patient's body with due account of keeping the strap against sliding in case of an asymmetric loading with the elastic tie-members at the front and rear.

Wilkinson fails to teach or suggest elbow supports. The present invention makes provision for elbow supports

shaped as a circular cuff encompassing the region of the elbow joint.

The purpose of the elbow support is for connecting the elastic tie-members running from the shoulder and from the hand, thus making possible functional loading of separate forearm and shoulder muscles during a treatment procedure.

Wilkinson teaches the elements called "knee supports" (as shown in FIG. 20). However, it is pointed out that the term "knee supports" is inconsistent with this definition, since these elements are in fact straps rather than supports and have the function of pressing the elastic cords against the patient's body surface. Besides, these elements are located on the thigh rather than in the knee area (See FIG. 20).

Inasmuch as the prior art construction elements are essentially straps, their function is to hold elastic cords near the body surface, whereby they cannot be similar to the knee supports of the claimed device.

The claimed device of the present invention comprises knee supports, each fashioned as a textile plate which encompasses the anterior knee surface and the lateral surfaces thereof and has fastening straps on the rear surface and fastening elements in the form of a plurality of elastic

tie-members running from above the thigh and from below along the shin.

The knee supports are used in the present invention for connecting the elastic tie-members; besides, they subdivide the members into two tiers, for the shin and for the thigh.

It is due to connection of the elastic tie-members to the knee supports that correction of the foot, shin, and thigh for position can be performed independently in the claimed device, which extends the possibility of using diverse therapeutic techniques and modalities.

Wilkinson teaches the elements called "pelvic supports" which, in Examiner's opinion, are interconnected through elastic cords arranged in antagonistic pairs.

However, such an inference is believed to be erroneous, since the term "pelvic supports" is inconsistent with this definition, because the prior art construction exhibits only a belt with loops or guides (See Ref. Nos. 50, 52 in FIGS. 2-4) through which elastic cords are passed. The belt and the guides are named "pelvic supports" which, however, is contrary to the fact, because the belt is the place of fastening said guides rather than the zone of

application of the forces developed by the elastic cords and therefore cannot be considered as the support.

Moreover, it is to be pointed out that the definition "antagonistic pairs" is not recited in Wilkinson, but the latter contains the term "mirror image". Consequently, this definition cannot be considered as identical to the claimed structure of the present invention, as it fails to define the relation between the cords and the body joints.

Thus, for instance, according to one of the embodiments of the prior art, elastic cords running from the shoulder to the shoe at the front and rear of the body are arranged in mirror image fashion.

The claimed device of the present invention comprises a pelvic support appearing as a belt which is in effect the zone of application of the forces developed by elastic tie-members which is an indispensable prerequisite for defining the term "support", while the concept of antagonism is defined with respect to the body joints.

In the claimed device, the trunk elastic tie-members that run from above, terminate in (that is, are held to) the pelvic support, while starting at the latter support are the leg elastic tie-members running therefrom downwards.

Thus, the claimed device of the present invention comprises supports which comprises various zones, wherein one elastic tie member terminates and another one originates. That is the elastic tie-members are held to all of the supports in an antagonistic pairs with respect to the body joints with due account of the anatomical arrangement of the skeletal muscles. This influences fundamentally the functional capabilities of the device aimed at accomplishing the object of the invention. A detailed description of the functions performed by the elastic tie-members arranged in antagonistic pairs with respect to the body joints has been discussed supra.

Wilkinson teaches the anchoring elements of elastic means which can be defined as "supports", viz, hand supports and shoes, which are constructionally the closest to the claimed device of the present invention. However, according to the overall combination of claimed features, the present invention differs substantially from *Wilkinson*.

Wilkinson teaches elastic cord to mean "flexible means".

There are guides on the belt and on the shoulder supports through which pass the elastic cords. Thus, this cord runs over the entire body and has the following end points: foot - shoulder; foot - hand; hand - the other hand.

Such a construction can be used only for associated exercises of both limbs.

There is observed a direct influence of the motion of one hand on that of the other, or on the motion of a leg in some interconnections (e.g., leg - hand or hand - the other hand).

It is noteworthy that all of the elastic cords are straight which is indicative of the absence of rotators and hence of impossibility for exercising rotational movements.

A principal difference of the claimed invention and the elastic tie-members resides in that they are fashioned as bundles 18 to 26 in number and are used in a plurality of variants and with variable anchoring points with respect to both bottom and top ends of tie-members.

Elastic tie-members are largely interposed between the neighboring support elements separately for the trunk and limbs, in such a manner: shoulder supports and pelvic support - on the trunk; hand, elbow support, shoulder support - on the arms; pelvic support, knee support, shoes, and knee supports, shoes - on the legs.

The claimed device comprises also obliquely running elastic tie-members, each having its own tension adjustor.

In addition, the fact that the claimed device is devoid of a connection between leg and hand or between both hands and hence of an influence of one hand on the other or on the leg, allows of independent correction of the foot, shin, and thigh for position.

Furthermore, it has been contended by the Patent Examiner that *Wilkinson* disclosed that the device comprises an elastic cord tension adjustor with a lock (FIGS. 10, 11).

However, it is pointed out that the prior art device comprises an elastic cord length adjuster with a lock rather than an elastic cord tension adjuster. The lock is located at one end of an elastic cord and the tension adjuster, at the opposite end of an elastic cord running to the respective one of the three pairs of supports.

The function of a cord length adjuster consists in setting such a cord length that corresponds to anthropological dimensions of the patient's body, which is entirely different from the use of the elastic tie-member tension adjuster in the present invention.

FIGS. 10 and 11 of *Wilkinson* show the construction of the lock, wherein the tongue 126 engages a slot in the housing 120, while the spring pin 122 catches the hole 124 of the tongue 126, whereby the lock is closed.

In the claimed device, the lock is essentially a conventional buckle with a square frame which is used in buckles of safety belts.

Thus, means for adjusting the tension of elastic tie-members used in the present invention differ substantially from those of the prior art device, as will now be discussed in detail hereinbelow.

According to the specification of the present application, (lines 4 to 7 on page 6), the means for tension adjustment of elastic tie-members 3 are bands 4 and a lock 5. One end of the band 4 is connected to the respective elastic tie-member 2, whereas the opposite end of the band 4 is held in the lock 5, which is located on one of the supports 1 and fixes the tension of the respective elastic tie-members. Tensioning of the elastic tie-members 2 shortens the tension adjusting elements (that is, the band 4) and hence a distance between the elastic tie-member 2 and the lock 5.

As a result of the tensioning force applied to the end of the band 4, the latter is released from the lock 5, whereas the portion of the band 4 which is situated on the opposite end of the lock 5, is shortened, thus tensioning the elastic tie-members 2.

The bands 4 held in the lock 5 remain in that position both before and after tensioning the elastic tie-members 2.

Tension of the elastic tie-members is adjusted with the aid of the aforementioned means in such a way as to attain a new position of the patient's trunk and limbs which would correspond to normal physiological position and at the same time approximate the maximum amplitude of the specific patient.

The deficiencies in the teachings of the Wilkinson primary reference are not overcome by the secondary references to Romney, Mikell, or Ratov.

The Romney U.S. Patent No. 5,308,305 teaches shoulder supports that differ significantly from those claimed in the present application. This is because the former supports appear as belts encompassing the shoulder and the armpit and intended for fixing the tie-members developing forces only in a horizontal plane as distinct from the claimed shoulder supports which are to fix the elastic tie-rods that develop forces both in a horizontal and a vertical plane.

Romney does not teach knee supports. The term "elbow support" disclosed in Romney means actually straps for pressing the tie-members to the arm. Romney teaches elastic

members only on the arms and legs, and support members, i.e., shoes, belt, shoulder belts and wrist cuffs between which said elastic tie members are located.

Elastic members are positioned with no account of the anatomical arrangement of the skeletal muscles and are located only on the anterior and posterior surfaces of the limbs rather than in the anatomic pairs with respect to the joints.

The principal differences between the claimed device and that of *Romney* are the same as those discussed supra with respect to the *Wilkinson* patent.

The *Mikell* U.S. Patent No. 2,467,943 discloses an exercise device for foot fixation.

Mikell teaches a strap means thrown over the leg just above the knee. The strap is held only with the leg flexed at the knee joint. The elastic members are arranged only on the shin. The device of *Mikell* has a very specific aim, i.e., muscular exercise by plantar flexion of the foot.

Mikell teaches the tension adjusters fashioned as pretension devices, which differs fundamentally from the claimed tension adjuster mechanism (See the aforestated comments regarding the patent to *Wilkinson*).

The device of Mikell comprises a chain of a number of links, any of which can be used to catch a snap-hook held to a spring. Such a tension adjustment fails to vary the tension during an exercising session.

The USSR Inventor's Certificate No. 1,639,674 issued April, 1991, to I.P.Ratov et al. discloses a training device for athletes.

The object of this reference is changing the trajectory-and-time characteristics of barbell lifting and preventing traumatic lesion of joints. This prior art device comprises elastic tie-members held to shoulders, waist, thigh and shin under the knee. Leg supports are fashioned as leg-encompassing rings.

Unlike the claimed device, elastic tie-members in this prior art device are arranged at the front and rear of the body unsymmetrically on the longer body axis, while in the claimed device of the present invention, elastic members are arranged over the entire body symmetrically on the front and rear thereof.

At the rear of body, the elastic members run from the shoulder belts to the thigh belts, and at the front said members pass from the under-knee support members to the waist.

It follows from the aforestated that no elastic members are provided in the prior art device below the knees, on the front trunk surface, on the thigh posterior surface, and on the arms.

The prior art device is also devoid of obliquely running elastic tie-members (rotators) and tension adjusters of these members.

As to the principal constructional differences between the claimed device and the prior art device discussed before, please refer to the abovestated analysis of the cited U.S. Patent No. 5,186,701 granted to Wilkinson.

In conclusion, it is respectfully pointed out that the cited references contain neither a combination of essential features of the claimed invention nor a principal object of the present invention.

The main purpose of the practical application of the claimed device, according to the present invention, is to correct mutual arrangement of body parts both with a static position of the patient's body and during its motion, as well as to establish physiologically normal stereotype of posture and movements, which is the principal object of the present invention.

The principal object of the present invention is to apply the device, according to the invention, for non-operative (conservative) treatment of the diseases of locomotorium resultant from various neuropathies and leading to patient's disturbed posture and motor activity.

Practical application of the present invention enables one to attain a further progress in technical results through correction of the locomotorium and energy loading of patient's movements in a new position of his/her limbs and trunk, which leads to activation of the central brain structures due to reorganization of the system of control over the movements of both the locomotorium and the speech formation motor apparatus. This enables one to treat patients afflicted by the various forms of infantile cerebral paralysis, as well as those suffering from post-cerebrovascular accident disturbance of motor activity.

For all the reasons set forth above, none of the prior art references provide an identical disclosure of the claimed invention. Hence, the present invention is not anticipated under 35 U.S.C. 102. Withdrawal of this ground of rejection is respectfully requested.

For the convenience of the Patent Examiner, the Applicants are enclosing herewith a copy of the Notice of Appeal and Petition for a three month extension of time

previously filed on January 26, 1996, in order to prevent abandonment of the present patent application.

In conclusion, the Applicants believe that the device for treatment of patients with disturbed posture and motor activity, as defined by the amended claims, is patentably distinct under 35 U.S.C. 103 over all the cited prior art references, whether these references are considered singly or in any combination thereof. Claims 4 to 6 have been canceled without prejudice, and have been rewritten as new claims 8 to 10. Thus, claims 7 to 10 are pending. The Applicants believe that these claims are now in condition for allowance. Early allowance of the claims and application based upon the merits of these claims is respectfully requested.

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Date: March 7, 1996

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Enclosures: 1. Copy of Petition for a three month extension of time
 2. Copy of Notice of Appeal

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Respectfully submitted,

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